OVERWEIGHT AND OBESITY TRENDS IN SLOVENIAN BOYS FROM 1991 TO 2006

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The study examined a group of overweight and obese Slovenian boys aged seven to eighteen with the use of an annually repeated cross sectional study. The study lasted from 1991 to 2006 and was based on the body mass index according to the IOTF norms. The results show that the proportion of overweight boys in this period increased by 40% (from 13.5% to 18.8%), whereas the proportion of obese boys more than doubled (from 2.8% to 6.1%). The prevalence of overweight and obesity is highest in childhood and early adolescence since it is more than twice as high than at the age of eighteen. Trends and the prevalence of obesity and overweight are similar to those in other countries and in compliance with Slovenia's geographical position in Europe. In recent years, it has been noticed that the 11 to 13 years age group represents the largest proportion of overweight boys. This is a year earlier than seen with past results; the numbers start to decrease after the age of 13. It is interesting to note that the age category with the biggest proportion of overweight boys describes the physically most active population, which is exposed to three hours of physical education per week under the guidance of specialist teachers. In addition, boys of this age most often participate in extracurricular sports activities. This anomaly of the BMI distribution found on the studied population is also characteristic of other populations. It can be concluded that excessive weight in this age period is more a result of physical development and less of external conditions; in other words, the reference values of the IOTF for this specific age group are not particularly suitable.

Keywords: Body mass index, overweight, obesity, boys, Slovenia.

INTRODUCTION

The lifestyle of young people at the present time usually consists of passive and unvarying mental activity and unhealthy habits which, among others, alarmingly include a sedentary lifestyle and unsuitable eating habits.

Various modern media are changing the behavioural patterns of young people, who enjoy fleeting entertainment in multicinema complexes or in front of TV and computer screens. The personal contacts of young people are being transferred to the virtual world of the internet; their desire for sensations and unusual scenarios is being fulfilled by viewing reality shows. In the study "Health behaviour in school aged children" (HBSC) Slovenian researchers have found that the number of hours young people in Slovenia spend in front of a computer has grown enormously in the last five years. In contrast, the time spent with friends has decreased, consequently resulting in the reduced communication and social competency of young people (Jeriček, 2007).

It is a common practice for children to go to school after having had a very poor breakfast or without eating one at all; further, fast food and sweet carbonated drinks are often consumed (Blenkuš, 2001). At weekends many young people enjoy themselves at parties where alcohol, cigarettes and drugs are nothing unusual (Jurak, 2006).

Unsuitable eating habits and a lack of movement result in overweight and obesity that are reaching epidemic proportions in the developed world (James, 2004). Excessive weight is becoming one of the most common diseases of children, according to experts of the World Health Organisation. In 2003, the WHO reported more than 1 billion overweight people globally, with at least 300 million of them being obese (WHO, 2003). Out of this population, 17.6 million were children under the age of five. Over the last decade the prevalence of obesity in western and westernising countries has more than doubled (James, 2004). It is estimated that 400,000 extra children are becoming overweight or obese each year in the population of the new European community. In Canada, Australia and parts of Europe 1% of all children are becoming overweight each year; 25% of children in the USA are overweight and 11% are obese (Lobstein, Baur, & Uauy, 2004). The WHO data for Europe for 2004 show that in the 13 to 15 year old population 12% of boys and 7% of girls were overweight and 2% of boys and 1% of girls were obese (Andersen, Froberg, Kristensen, & Møller, 2007).

About 70% of obese adolescents grow up to become obese adults (Parsons, Power, Logan, & Summerbell,

1999). Obese children under three years of age without obese parents are at a low risk of obesity in their adulthood but, among older children, obesity is an increasingly important predictor of adult obesity regardless of whether one's parents are obese (Whitaker, Wright, Pepe, Seidel, & Dietz, 1997).

There are several consequences of obesity. Along with increased mortality, obesity is a risk factor for a range of chronic diseases such as Type 2 (adult onset) diabetes, coronary heart disease, some types of cancer, osteoarthritis and back pain (Andersen, Froberg, Kristensen, & Møller, 2007). Some childhood obesity consequences – hyperinsulinaemia, poor glucose tolerance and a raised risk of Type 2 diabetes, hypertension, sleep apnoea, social exclusion and depression – onset already in childhood, while other obesity epidemic diseases emerge in adulthood (Lobstein, Baur, & Uauy, 2004).

There are also social and psychological consequences – including stigmatisation, discrimination and prejudice. Researches have linked obesity with a low self image, low self confidence and depression (Cash, 2002; Goni & Zulaka, 2000; Lobstein, Baur, & Uauy, 2004).

The mechanism of obesity development is not fully understood and is believed to be a disorder with multiple causes. Genetic factors influence the susceptibility of a given child to an obesity conducive environment. However, environmental factors, lifestyle preferences and the cultural environment seem to play big roles in the rising prevalence of obesity worldwide. It is confirmed that obesity occurs when energy intake exceeds energy expenditure, suggesting a proper diet and physical activity are the key strategy for controlling the current epidemic of obesity (Dehghan, Akhtar-Danesh, & Merchant, 2005).

There is a wide variety of definitions of child obesity and no commonly accepted standard has yet emerged. Although less sensitive than skin fold thickness, the body mass index (weight/height^2) is widely used in adult populations and a cut off point of 25 kg/m^2 and 30 kg/m^2 is recognised internationally as a definition of adult overweight and obesity (Malina & Katzmarzyk, 1999). The International Obesity Task Force (IOTF) proposed age and sex specific cut off points from 2–18 years which are internationally based and should help provide internationally comparable prevalence rates of overweight and obesity in children (Cole, Bellizzi, Flegal, & Dietz, 2000).

A number of studies on the prevalence of obesity in European children and adolescents in different years after 1990 was reviewed by Lobstein, Baur and Uauy (2004) and Brettschneider and Naul (2004). The prevalence (percentage) of overweight (including obese) children aged around 7–11 years using the IOTF cut off points was especially high in southern Europe (Italy 36%, Spain 34%, Greece 31%), and substantially lower in northern Europe (Holland 12%, Denmark 15%, Germany 16%). Among adolescents aged around 14–17 years, the prevalence ranged from below 10% (Slovakia, Czech Republic, Russia) to above 20% in some southern countries (Cyprus 23%, Greece 22%, Spain 21%). There are differences between boys and girls, e. g. in Great Britain the prevalence of excessive weight and obesity in 5 to 10 year olds from 1984 to 2002–2003 is much higher in girls (Stomatakis et al., 2005), whereas the WHO data (Andersen, Froberg, Kristensen, & Møller, 2007) show that the proportion of 13 to 15 year old overweight boys is significantly larger than that of their girl counterparts in all but one country. Similarly, the proportion of obese boys is larger than that of girls in the majority of countries. The biggest differences between genders are noticed in Mediterranean countries such as Spain, Italy, Portugal, Greece and Malta. With adults, the proportion of overweight European women (with a BMI above 30) is between 10 to 25% which is slightly more than the proportion of overweight men (10 to 20%) (Andersen, Froberg, Kristensen, & Møller, 2007). Authors also warn about the poor effect of interventional actions designed to reduce excessive weight in adults; therefore, it is even more important for countries to establish efficient strategies for decreasing the excessive weight of young people.

For Slovenia, according to the IOTF cut off points, the prevalence of excessive weight among five year old children in 2004 was 12.5% and 16.7% for boys and girls, respectively. The obesity criteria are fulfilled by 4.1% of boys and 4.7% of girls. Among adolescents, between the years 2003–2005, 18.9% of boys and 16.7% of girls were overweight and 3.5% of boys and 3.4% of girls were obese (Avbelj et al., 2005). The percentage of 7 to 19 year old overweight and obese girls and boys, as shown in cross sectional (Bučar-Pajek, Strel, Kovač, & Pajek, 2004; Strel, Kovač, & Jurak, 2007) and longitudinal studies of children and youth (Strel, Kovač, & Rogelj, 2006), jumped up dramatically from 1983 to 2003, especially in younger age groups.

The present study used data from the fitness evaluation system Sports Educational Chart, which has been carried out in all Slovenian schools annually since 1991 (Strel et al., 1997). Because of the huge amount of data only the results for boys are analysed and presented in this article. The data regarding girls is available upon request to interested readers by directly contacting the authors of this article.

METHODOLOGY

Sample of measured subjects

The sample (TABLE 1) consists of all boys who participated in measurements as part of the fitness evaluation system Sport Educational Chart (Strel, Kovač,

& Rogelj, 2006; Strel et al., 1997; Šturm et al., 1990) from 1991 to 2006. Measurements were held annually in April during the usual physical education lessons in all Slovenian schools. Only healthy boys who were not exempt from physical education for health reasons and whose parents had given their written consent to participate in the measurements were included.

Slightly more than 90% of primary school boys below the age of 15 were measured, whereas the proportion of older boys (16 to 19 years) is between 60–84%, depending on the type of high school (Strel, Kovač, & Rogelj, 2006). High school education is not compulsory in Slovenia; nevertheless, the number of those attending high schools is growing every year and has in the last decade included more than 90% of all young people. In addition, the proportion of young people entering four year high school programmes has also been increasing and those entering two and three year programmes decreasing, thus providing more data about the 17 and 18 year old population.

In the first year of school (seven year old children) an apparent increase in the number of boys is noted between the years 2000 and 2004. In that period, a gradual transition to the then new nine year long compulsory education started in Slovenia, which meant that children entered schools earlier. The transition to nine year long compulsory education was gradual so that between 2000 and 2005, six and seven year old pupils were entering their first year of primary school. A smaller number of boys is noticed in other years as a result of the birth rate having decreased by more than a third (Statistical office of the Republic of Slovenia, 2006).

Data analysis

Data were analysed with the use of the SPSS 15.0 statistical package. The prevalence of excessive weight (excluding obesity) and obesity as such were determined according to the IOTF cut off points (Cole et al., 2000) separately for age (7 to 18 year old boys, ±6 months) and the year of measurement (1991 to 2006). Confidence intervals for the proportions were computed using the Collett formula (Collett, 1991).

RESULTS

The prevalence of overweight and obesity in 7 to 18 year old boys from 1991 to 2006 is shown in TABLE 2 and 3. A 95% confidence interval width for the overweight proportion ranges from 1.1% to 3.2%, but is only wider than 2% for seven year old boys. A 95% confidence interval width for the obese proportion ranges from 1.1% to 3.2% and rarely exceeds 1.5%. The confidence interval width for the proportion of overweight and obese boys is never higher than 20.6% and 37.8%, respectively, of its point estimate. As the sample used in this study is not a probability sample, the listed confidence intervals should only be considered for descriptive purposes.

When the entire sample is considered irrespective of the age of boys, the proportions of overweight and obese boys are almost steadily growing from 1991 to 2006. In the observed period the percentage of obese boys more than doubled – from 2.8% in 1991 to 6.1% in 2006,

TABLE 1
Sample sizes by age of boys and year of measurement

Year	Age											
	7	8	9	10	11	12	13	14	15	16	17	18
1991	2867	11886	12647	13053	13298	13921	13691	13168	12391	9850	8564	6533
1992	2706	11888	12197	12799	13353	13797	14006	13739	12718	11187	10034	7763
1993	2653	11955	12096	12356	13048	13685	13880	13986	13420	11403	10833	8348
1994	2814	11364	12315	12326	12626	13455	13792	13803	13782	12229	11102	9363
1995	2792	11541	11365	12280	12300	12753	13383	13591	13254	11908	11320	9180
1996	2608	12049	11909	11593	12567	12602	12820	13323	13026	10596	10644	9179
1997	2295	10724	11813	11497	11276	12209	11994	12100	11547	8710	8600	7486
1998	2267	10200	10878	11808	11632	11327	12163	11838	11331	9392	8709	7705
1999	2113	10150	10378	10944	11945	11696	11305	11934	11112	8982	8361	7302
2000	2655	9247	10335	10478	11083	12007	11576	11143	11198	9078	8535	7563
2001	3216	9365	9409	10276	10414	10955	11741	11257	10394	9038	8418	7347
2002	4284	8897	9445	9453	10287	10413	10865	11537	10534	8167	8137	7279
2003	5688	9022	9018	9495	9510	10377	10349	10820	10917	8592	7692	7240
2004	8642	8935	9111	9026	9502	9492	10287	10320	10209	8957	8288	6895
2005	8391	8814	8989	9160	9135	9619	9481	10296	9695	8184	8159	7192
2006	8142	8329	8667	8789	8982	8918	9370	9247	9174	6525	7062	6715

TABLE 2
Prevalence of overweight (excluding obesity) in Slovenian boys (in %) from 1991 to 2006

Year	Age											
	7	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**
1991	12.0	12.4	12.7	13.6	14.0	14.0	13.7	13.3	13.1	14.6	13.7	14.0
1992	10.9	11.4	12.2	12.4	13.2	13.1	12.3	11.7	11.3	12.6	12.6	11.4
1993	11.5	12.1	13.8	14.0	14.4	15.1	14.5	13.0	12.5	13.4	13.8	12.6
1994	12.1	11.9	13.5	15.3	15.5	15.6	15.3	13.9	13.7	14.3	13.8	13.5
1995	13.0	12.9	13.9	14.9	15.8	16.3	15.2	14.5	13.4	14.6	14.4	12.8
1996	12.5	13.1	14.6	14.9	16.0	16.8	16.0	14.4	14.5	15.5	14.9	14.0
1997	12.7	13.3	14.7	15.5	15.5	16.1	15.6	14.9	13.7	15.6	14.4	13.9
1998	13.0	13.9	15.6	15.6	16.7	16.6	15.9	15.1	14.8	15.1	15.3	14.5
1999	12.9	13.0	15.6	17.2	16.6	17.5	16.5	15.0	14.9	15.1	14.5	14.7
2000	12.4	14.4	16.2	17.4	18.4	17.3	17.7	16.0	15.1	15.8	15.5	14.1
2001	13.4	14.3	16.5	18.0	19.0	18.7	17.7	17.3	15.5	15.8	15.5	15.4
2002	12.3	14.1	16.1	17.5	17.8	19.1	18.2	16.6	16.1	15.8	14.9	14.4
2003	11.1	14.3	16.5	17.3	18.8	18.6	18.1	16.9	15.7	15.6	15.5	14.9
2004	12.5	14.9	17.8	19.0	19.5	19.4	19.2	17.8	17.0	17.7	16.5	16.5
2005	12.5	14.8	17.9	19.2	19.6	20.8	19.7	18.2	17.3	18.5	18.5	16.9
2006	13.4	15.8	18.3	19.7	21.0	21.1	20.7	19.5	18.6	19.5	19.2	18.6

TABLE 3
Prevalence of obesity in Slovenian boys (in %) from 1991 to 2006

Year	Age											
	7	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**
1991	3.7	3.6	3.6	3.2	3.1	3.0	2.8	2.2	2.2	2.2	2.0	1.2
1992	3.3	3.2	3.0	2.7	2.7	2.5	2.4	2.0	1.9	1.6	1.5	1.1
1993	4.0	4.1	3.6	3.6	3.2	3.2	2.8	2.5	2.1	2.1	1.6	1.2
1994	4.2	4.4	4.2	3.9	3.7	3.6	3.4	2.8	2.4	2.2	1.9	1.3
1995	3.7	4.5	4.6	4.3	4.0	3.9	3.5	3.4	2.8	2.8	1.9	1.8
1996	5.9	4.9	5.0	4.6	4.5	4.0	4.0	3.3	3.2	3.0	2.1	1.9
1997	5.0	5.5	4.6	4.6	4.1	4.1	3.7	3.4	2.8	3.1	2.6	1.7
1998	5.4	5.7	5.5	4.8	4.8	4.3	4.2	3.3	3.2	3.2	2.8	1.8
1999	4.6	5.5	6.1	5.5	5.0	4.7	4.2	3.8	3.2	3.7	2.7	2.1
2000	6.5	5.2	5.4	5.4	5.6	5.1	4.5	3.9	3.5	3.5	3.1	2.1
2001	6.7	6.5	6.0	5.6	5.6	5.7	4.9	4.5	3.8	3.9	3.0	2.6
2002	5.7	6.5	6.2	5.4	5.3	5.4	5.1	4.1	4.0	3.8	3.3	2.2
2003	5.6	6.0	6.2	5.7	5.0	4.9	5.0	4.3	4.0	3.8	3.2	2.2
2004	5.4	5.9	6.5	6.1	6.1	5.7	5.0	5.0	4.4	4.1	3.3	2.5
2005	6.6	7.0	6.4	6.9	6.9	6.8	5.9	5.1	4.8	4.9	3.7	2.9
2006	6.7	7.3	7.6	6.9	7.1	7.1	6.9	5.5	4.9	5.0	4.5	2.9

whereas the percentage of overweight (excluding obese) boys grew from 13.5% in 1991 to 18.8% in 2006.

Although the overall prevalence of overweight and obese boys was continuously growing from 1991 to 2006, the pattern of changes (Fig. 1 and 2) remained almost the same. The percentage of overweight children has the highest values between the ages of 11 and 13 and then steadily decreases until the age of 15. At the age of 16 it slightly increases again and then gradually decreases until the age of 18, whereas the percentage of obese children only increases from the age of seven to nine and until the age of 18 it decreases to less than half of its maximal value.

Fig. 1
Proportion of overweight and obese boys in Slovenia from 1991 to 2006

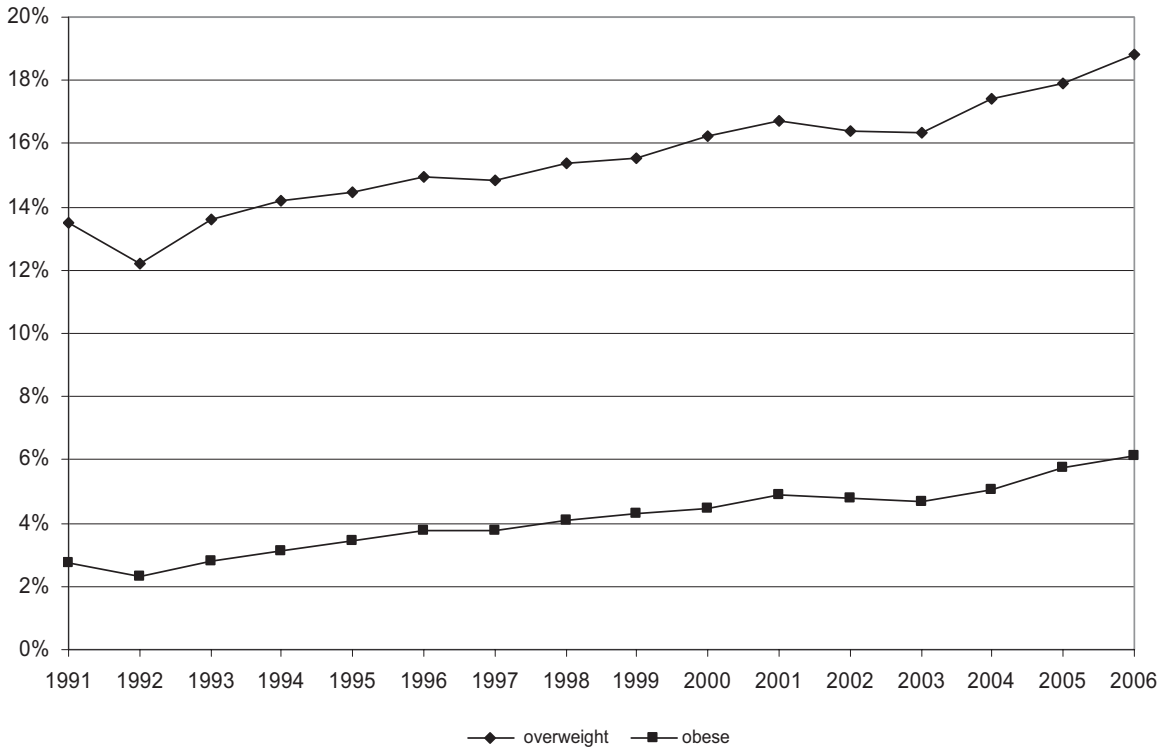


Fig. 2
Proportion of overweight boys at different ages in Slovenia from 1991 to 2006

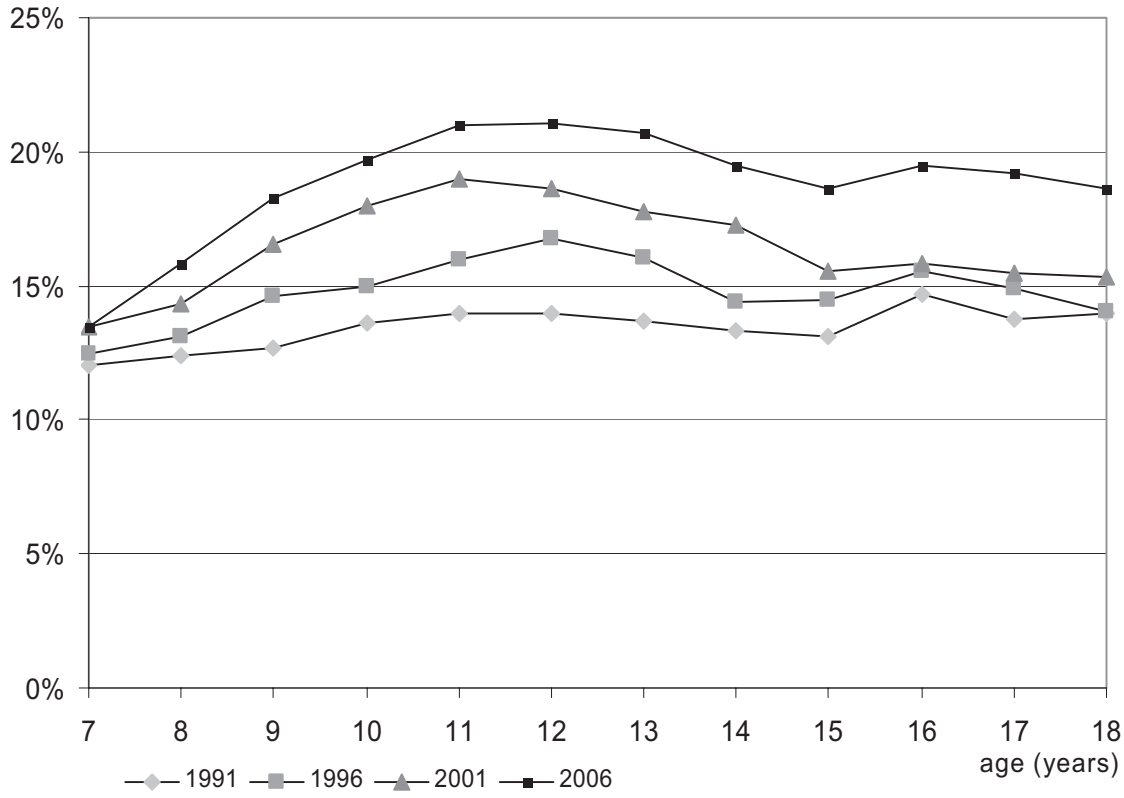
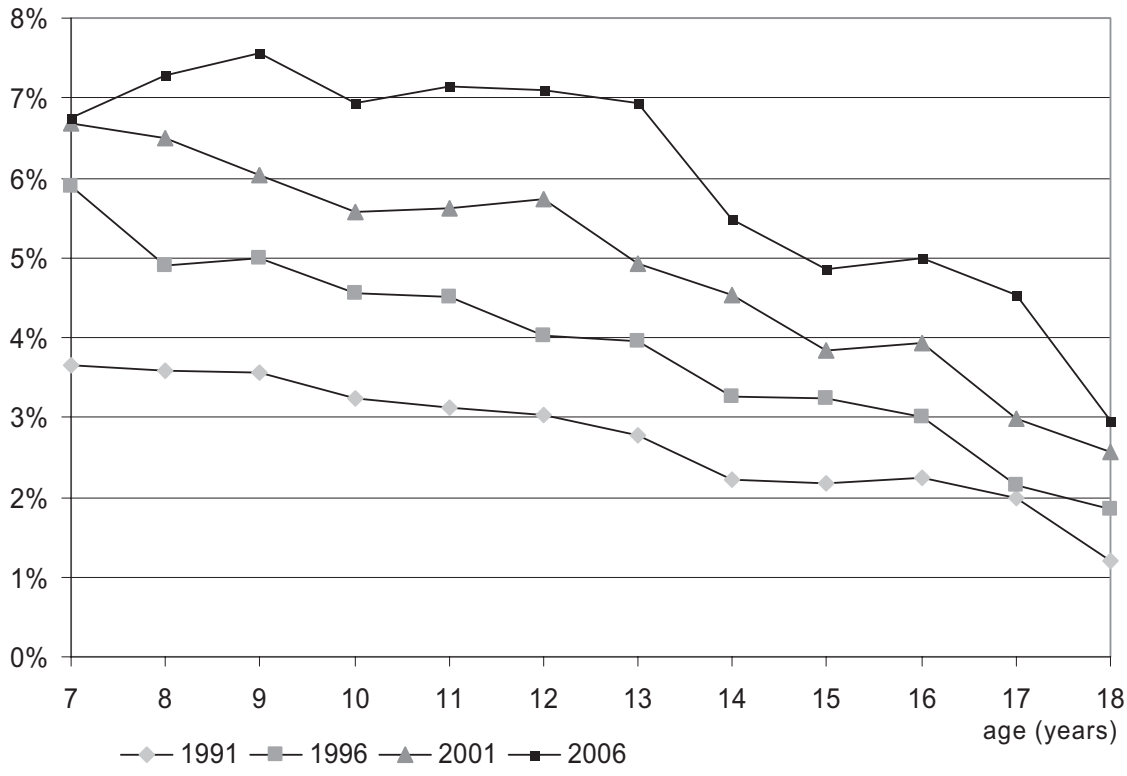


Fig. 3
Proportion of obese boys at different ages in Slovenia from 1991 to 2006



DISCUSSION

There are some limitations of the study. Although the sample is large, it is not a probability sample of all boys aged 7–18 years in Slovenia. Namely, since 1996 (when new education legislation was passed) only healthy boys who have the written consent of their parents are included. Nevertheless, the same limitations apply even with probability sampling; further, the sampling procedure was the same throughout the study. Therefore, there is no reason for the described trends not to apply to the entire population. There are some reasons to believe that the prevalence of overweight and particularly obesity within the population is in fact higher than described in the article as obese pupils are less inclined to participate. These limiting factors have also been described in similar studies by others (Andersen, Froberg, Kristensen, & Møller, 2007).

Undoubtedly the prevalence of overweight and obesity is taking on epidemic proportions. The percentage of overweight and obese boys in Slovenia was rising almost constantly every year from 1991 to 2006. The only exception is the beginning of the studied period (in 1992), which is probably due to establishment of the new state of Slovenia in 1991. In that year an important migration of the population occurred; also the introduction of a new currency, the loss of important markets in parts of former Yugoslavia and the transition from a socialist to a capitalist economic system resulted in economic instability; further, some novelties were introduced into the education system. A decrease in the proportion of overweight and obese population is also noticed in other countries going through similar changes or in times of economic recession (such as Russia, Croatia, Poland and Czech Republic) (Andersen, Froberg, Kristensen, & Møller, 2007).

The trajectories for the five year periods (1991–1996–2001–2006) show a smaller increase in the proportion of overweight children at the age of seven and then a faster increase in the proportion in the preadolescent period between the ages of 9 and 14. Whereas in the period between 1991 and 1996 the biggest proportion of overweight children was noticed for 12 year olds, in the last decade this proportion is highest in 11 year old children. Further, in 2006 the proportion of overweight children decreased more slowly and less steeply than previously. It can be concluded that excessive weight in this age period is more a result of physical development and less of external conditions; in other words, the reference values of the IOTF for a specific age group are not particularly suitable. This anomaly of the BMI distribution found on the studied population is also characteristic of other populations (Rolland-Cachera, Cole, Sempe, Tichet, Rossignol, & Charraud, 1991).

Also worrying is the status of the population older than 15 years; namely, in 2006 a considerable increase in the proportion of overweight young people was noticed in comparison to previous periods.

Obesity is rising at higher rates than excessive weight as it has more than doubled in just 15 years. The proportion of overweight boys increases between the ages of 7 and 13 and then gradually decreases until the age of 18. The proportion of the obese population has been decreasing from around 7 year old to 18 year old boys, with an exception in 2006 where an increase was shown from the ages 7 to 9, followed by a first dip at the age of 10 and a partial stagnation until the age of 13; afterwards the decrease until the age of 18 is slightly larger than in other periods.

It should be mentioned that the proportion of the measured population is slightly lower in high schools compared to primary school and that it also depends on the type of school involved. In gymnasium programmes it included over 85% of the population, whereas in vocational schools this value stands at around 60% (Strel, Kovač, & Rogelj, 2006). Particularly vocational schools show a larger proportion of overweight and obese boys (Brettschneider & Naul, 2004; Kovač, Strel, & Leskošek, 2007; Kristensen, Wedderkopp, Møller et al., 2006) as these boys come from families with a lower social status and it can be presumed that the actual proportion of young people with excessive weight is higher than shown.

The age period between 11 and 18 years is marked in the Slovenian education system by the introduction of specialised physical education teachers; the results of motor tests significantly improve (Strel et al., 2003) due to the better working conditions of this age group (a smaller number of children in a group, lessons carried out in sports halls and other specialised places – dance and fitness studios, etc.) and sports teachers' better knowledge about systematic work and the selection of suitable contents and work loading. It is surprising to notice that the proportion of children with excessive weight is highest particularly in the period between the ages of 11 and 13, when young people have the best conditions available for sports activities in schools and still show an interest in free time sports participation in sports clubs. It can be concluded that the excessive weight seen in this period is connected with the transition to puberty, where an accelerated increase of height is still not noticed although the body mass is already increasing (Strel, Kovač, & Rogelj, 2006).

The prevalence of overweight and obesity, its secular trends and pattern of changes from childhood to adolescence in Slovenia are similar to those in many other countries in Europe and the rest of the world. Although the data are not directly comparable with recent studies in other European countries reviewed by Lobstein and Frelut (2003) due to methodological and other differences, it seems that the prevalence of overweight children in Slovenia is in conformity with the country's geographical position in Europe. As an example, in 2000 the prevalence of overweight (including obese) 7–9 year old boys in Slovenia was 20.4%, while the prevalence of overweight children (Lobstein & Frelut, 2003 – did not report the results separately for boys and girls) of the same age and in a similar period (most studies were carried out in 1997–2001) were around 30–35% in Mediterranean countries and around 20% in other countries. With 14 to 17 year old boys, the equivalent prevalence in Slovenia was 19.1%, while in Europe it ranged from 8–23%.

The increase in the proportion of both (overweight and obese) groups in developed countries is a result of the different ways young people spend their free time; their characteristics are mainly motor inactivity and incorrect diets (energy rich food and unsuitable eating habits). The way young people spend their free time has changed in recent years. Most studies show that the volume of free time physical activities gradually decreases with age (Brettschneider & Naul, 2004; Jurak et al., 2003; Riddoch et al., 2004). A review of several European studies (Currie et al., 2004; Engström, 2002) shows that physical activity significantly decreases with age – 3% per annum for boys. Data from the HBSC research for Slovenian boys show that only every second Slovenian boy is moderately to intensively active at the age of 11; the information is also valid for 41% of 13 year olds and every third 15 year old boy (Stergar, Scagnetti, & Pucelj, 2006). These results indicate that the physical activity of Slovenian boys is above the average of other countries included in the HBSC study, nevertheless, it is far from satisfactory as it has been noticed that in recent years the proportion of the physically active population has been shrinking (Jurak, 2006; Jeriček, 2007).

Unfortunately it has been noted (Gabrijelčič Blenkuš, 2001; Stergar, Scagnetti, & Pucel, 2006) that the number of overweight and obese boys in the period of adolescence is also a result of unhealthy eating habits. In the Slovenian part of the HBSC study the authors state that 8% of boys were found to follow some kind of diet; at the same time only 64% of boys were happy with their body weight (Stergar, Scagnetti, & Pucel, 2006). The proportion of people who think of themselves as overweight is also increasing among boys. Although they did not follow any diet, 20% of boys (and 33% of girls) were convinced that they needed to lose weight.

With young people and particularly with boys, a "shallow" approach to nutrition is being noticed instead of enjoying healthy meals (Stergar, Scagnetti, & Pucel, 2006). Presumably, this is a result of the easier access to various snacks (Drummond, Crombie, & Kirk, 1996). Gabrijelčič Blenkuš (2001) found that pupils in

Ljubljana eat irregularly (leaving out breakfast and dinner) and do not have regular eating patterns. Particularly exposed are pupils from vocational schools whose meals are also of the poorest quality. According to the HBSC data 42% of boys always eat breakfast, on the other hand 30% of boys never have breakfast at all. From year 5 of primary school to year 1 of high school the proportion of boys having breakfast decreases by 7.5%. Boys more often than girls have at least three meals a day, however, the quality of their meals is poorer as they do not eat enough fruit and vegetables and consume too many sweet drinks (Stergar, Scagnetti, & Pucel, 2006).

The health consequences of excessive weight during childhood are less clear but a systematic review shows that childhood obesity is strongly associated with risk factors of cardiovascular disease (CVD) and diabetes, orthopaedic problems and mental disorders (Andersen, Froberg, Kristensen, & Møller, 2007; Dietz, 1998). The number of children with health problems is also on the rise in Slovenia, particularly among the youngest children (Brcar, 2005). An increased tendency has been noted for diseases of the muscular-skeletal system and mental and behavioural disorders.

An unhealthy lifestyle in the adult population is another reason for the increase in the proportion of men dying from cardiovascular diseases. This is also one of the reasons why Slovenian men have a significantly lower life expectancy (68.9 years) than women (77.8 years) (Statistical office of the Republic of Slovenia, 2006).

CONCLUSION

Clearly the prevalence of overweight and obesity is also taking on epidemic proportions in Slovenia (Bučar Pajek, Strel, Kovač, & Pajek, 2004; Strel, Kovač, & Jurak, 2007). The percentage of overweight and obese boys in Slovenia rose almost constantly every year from 1991 to 2006, with the only real exception at the beginning of the period (in 1992). Obesity is growing at higher rates than overweight, as it has more than doubled in just 15 years.

The proportion of overweight boys is increasing nearly constantly between the ages of 7 and 18, whereas the proportion of obese boys decreases with age. It is interesting to notice the biggest increase in the 15 year period was noted for boys aged 10 to 13 as this period is marked with specialised PE teachers and the best available conditions in schools, as well as the largest participation in extracurricular sports programmes. The results for the high school population are slightly better; nevertheless, the proportion of overweight and obese boys is twice as high as in girls (Strel, Kovač, & Jurak, 2007).

Warnings about these negative trends have already been issued for a longer period; unfortunately the government does not listen to health and sports experts. Particularly in the last two years a reduction in the hours for physical education lessons has occurred in high school programmes (Kovač, 2006), with this being one of the biggest mistakes of educational policy makers. Therefore, sports pedagogues and health workers are calling for an increase and not a decrease in the number of physical education lessons and improved access to free extracurricular sports programmes; however, it is also vital that parents ensure healthy eating habits and limit children's time spent in front of TV and computer screens.

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TENDENCE K NADVÁZE A OBEZITĚ U SLOVINSKÝCH CHLAPCŮ V LETECH 1991–2006

(Souhrn anglického textu)

Studie zkoumala skupinu slovinských chlapců ve věku od sedmi do osmnácti let trpících nadváhou nebo obezitou, a to s použitím každoročně opakovaného průřezového výzkumu. Výzkum, probíhající od roku 1991 do roku 2006, byl založen na měření indexu tělesné hmotnosti podle norem Mezinárodní asociace pro studium obezity (IOTF). Výsledky ukazují, že podíl chlapců s nadváhou v tomto období vzrostl o 40 % (ze 13,5 % na 18,8 %), přičemž podíl obézních chlapců se více než zdvojnásobil (ze 2,8 % na 6,1 %). Rozšíření nadváhy a obezity je nejvyšší v dětství a rané adolescenci, kdy je více než dvojnásobné v porovnání s věkem osmnácti let. Trendy a prevalence obezity a nadváhy jsou podobné jako v ostatních zemích a odpovídají zeměpisné poloze Slovinska v Evropě. V posledních letech bylo zaznamenáno, že nejvyšší počet chlapců s nadváhou patří do věkové skupiny 11 až 13 let. Věk se v porovnání s výsledky z minulosti snížil o jeden rok. Počet začíná klesat po 13. roku. Zajímavé je, že věková kategorie s nejvyšším výskytem chlapců s nadváhou zahrnuje rovněž fyzicky nejaktivnější populaci, která má tři hodiny tělesné výchovy týdně pod vedením specializovaných pedagogů. Kromě toho se chlapci v tomto věku velice často účastní mimoškolních sportovních aktivit. Tato anomálie v distribuci BMI, kterou jsme u zkoumané populace konstatovali, je charakteristická také pro jiné populace. Lze tedy učinit závěr, že nadměrná váha v tomto období je spíše výsledkem tělesného vývoje než vnějších podmínek. Jinými slovy, referenční hodnoty IOTF nejsou pro tuto konkrétní věkovou skupinu zcela vhodné.

Klíčová slova: index tělesné hmotnosti BMI, nadváha, obezita, chlapci, Slovinsko.

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